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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/710,421 | 07/09/2004 | Shih-Chang Shei | 12119-US-PA | 4420 |

31561 7590 08/09/2005

JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE
7 FLOOR-1, NO. 100
ROOSEVELT ROAD, SECTION 2
TAIPEI, 100
TAIWAN

EXAMINER


NGUYEN, JOSEPH H

ART UNIT PAPER NUMBER

2815

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------------|---|--|
| Office Action Summary | Application No. 10/710,421 | Applicant(s) SHEI ET AL.  | |
| | Examiner Joseph Nguyen | Art Unit 2815 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over figure 5 of Sheu et al. (US 2002/0179914).

Regarding claim 1, Sheu et al. discloses in figure 5 a flip chip light-emitting diode package, comprising: a shunt diode (para [0063], line 2); and a light-emitting diode (para [0061], lines 1-2), disposed on the shunt diode by flip-chip bonding process, wherein the light-emitting diode and the shunt diode are connected reverse and in parallel. Sheu et al. does not disclose on figure 5 an Schottky diode. However, Sheu et al. discloses in (para [0033], lines 6-8) a Schottky diode or shunt diode can be alternatively used as an LED protector. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify figure 5 of Sheu et al. by employing a Schottky diode as an LED protector because shunt diode and Schottky diode are recognized in the art as equivalents.

Regarding claim 2, Sheu et al. discloses in figure 5 the package further comprises a plurality of solder bumps 323 (para [0063], line 3) disposed between the

Schottky diode and the light-emitting diode so that the Schottky diode and the light-emitting diode are connected reverse and in parallel.

Regarding claim 3, Sheu et al. discloses in figure 5 a substrate 300 (para [0062], line 2); a semiconductor layer disposed on the substrate, wherein the semiconductor layer at least comprises a first conductive type doped semiconductor layer 306 (para [0062], line 3), a second conductive type doped semiconductor layer 310 (para [0062], line 3) and a light emitting layer (para [0062], line 4), and the light emitting layer is disposed on the first conductive type doped semiconductor layer and the second conductive type doped semiconductor layer is disposed on the light emitting layer; a first electrode 316 (para [0062], line 5), disposed on the first conductive type doped semiconductor layer; and a second electrode (para[0062], line 5), disposed on the second conductive type doped semiconductor layer.

Regarding claim 4, Sheu et al. discloses material forming the first electrode is selected from a group consisting of Ti/Au (para [0053], lines 5-6).

Regarding claim 5, Sheu et al. discloses material forming the second electrode is selected from a group consisting of Ni/Au (para [0056], lines 6-7).

Regarding claim 6, Sheu et al. discloses the second electrode comprises an N type transparent conductive oxide layer (para [0056], lines 7-8).

Regarding claim 7, Sheu et al. discloses material constituting the N type transparent conductive oxide layer comprises ITO (para [0056], lines 7-8).

Regarding claim 8, Sheu et al. discloses material constituting the P type transparent conductive oxide layer comprises CuAlO_2 (para [0056], line 10).

Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over figure 5 of Sheu et al. and further in view of figure 2B of Sheu et al.

Regarding claim 9, Sheu et al. discloses in figure 5 substantially all the structures set forth in the claimed invention except an ohmic contact layer, disposed on a portion of the first surface and the second surface of the submount; and a Schottky contact layer, disposed on a portion of the first surface of the submount, wherein the ohmic contact layer and the Schottky contact layer being electrically isolated. However, Sheu et al. discloses on figure 2B an ohmic contact layer 46b (and a layer on the bottom surface of element 42), disposed on a portion of the first surface and the second surface of the submount 42; and a Schottky contact layer 46a, disposed on a portion of the first surface of the submount, wherein the ohmic contact layer and the Schottky contact layer being electrically isolated (see para [0008]). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify figure 5 of Sheu et al. by having an ohmic contact layer, disposed on a portion of the first surface and the second surface of the submount; and a Schottky contact layer, disposed on a portion of the first surface of the submount, wherein the ohmic contact layer and the Schottky contact layer being electrically isolated to effectively protect the LED against damages due to electrostatic discharge (para [0007], lines 3-4, Sheu et al.).

Regarding claim 10, Sheu et al. discloses the submount 42 comprises an N doped material (para [0008], line 8).

Regarding claim 11, it is well known in the art the n type and p type can be interchanged, merely depending upon a certain application or design.

Regarding claim 12, Sheu et al. discloses material forming the submount 42 is selected from a group consisting of Si (para [0008], line 8).

Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over figure 5 of Sheu et al. and figure 2B of Sheu et al, and further in view of Yonezawa et al. (US 20040157432).

Regarding claims 13 and 14, Sheu et al. discloses material forming the ohmic contact layer comprises copper (para [0063], lines 10-11), not aluminum (claim 13) or titanium (claim 14). However, Yonezawa et al. discloses on para [0055] copper and aluminum and titanium can be alternatively used to form the conductive film. Note that this conductive film can be used as an ohmic contact. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify figures 5 and 2B of Sheu et al. by having the ohmic contact layer comprising aluminum or titanium because they (Cu, Ti, Al) are recognized in the art as equivalents.

Claims 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheu et al. in view of Ikeda (US 6,900,698).

Regarding claim 15, Sheu et al. discloses in figure 5 substantially all the structures set forth in the claimed invention (see rejection of claim 1) except a plurality of Schottky diodes being electrically connected in series. However, Ikeda discloses on

figure 1B a plurality of Schottky diodes being electrically connected in series (col. 1, lines 65-67). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sheu et al. by having a plurality of Schottky diodes being electrically connected in series to improve the ESD resistance without impairing the characteristics of a high frequency device (col. 2, lines 9-10, Ikeda).

Regarding claims 16-22, similar to rejection of claims 2-8, Sheu et al. discloses all the structures set forth in claims 16-22.

Claims 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheu et al. and Ikeda and further in view of figure 2B of Sheu et al.

Regarding claim 23, figure 5 Sheu et al. and Ikeda show substantially all the structures set forth in the claimed invention except an ohmic contact layer, disposed on a portion of the first surface and the second surface of the submount; and a Schottky contact layer, disposed on a portion of the first surface of the submount, wherein the ohmic contact layer and the Schottky contact layer being electrically isolated. However, Sheu et al. discloses in figure 2B an ohmic contact layer 46b (and a layer on the bottom surface of element 42), disposed on a portion of the first surface and the second surface of the submount 42; and a Schottky contact layer 46a, disposed on a portion of the first surface of the submount, wherein the ohmic contact layer and the Schottky contact layer being electrically isolated (see para [0008]). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made

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to modify figure 5 of Sheu et al and Ikeda by having an ohmic contact layer, disposed on a portion of the first surface and the second surface of the submount; and a Schottky contact layer, disposed on a portion of the first surface of the submount, wherein the ohmic contact layer and the Schottky contact layer being electrically isolated to effectively protect the LED against damages due to electrostatic discharge (para [0007], lines 3-4, Sheu et al.).

Regarding claims 24-26, similar to rejection of claims 10-12, Sheu et al. discloses all the structures set forth in claims 24-26.

Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over figure 5 of Sheu et al. and Ikeda and figure 2B of Sheu et al., and further in view of Yonezawa et al. (US 20040157432).

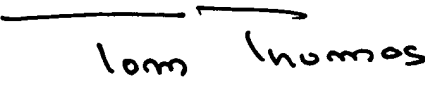
Regarding claims 27-28, Sheu et al. discloses material forming the ohmic contact layer comprises copper (para [0063], lines 10-11), not aluminum (claim 13) or titanium (claim 14). However, Yonezawa et al. discloses in para [0055] copper and aluminum and titanium can be alternatively used to form the conductive film. Note that this conductive film can be used as an ohmic contact. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify figure 5 of Sheu et al. and Ikeda and figure 2B of Sheu et al. by having the ohmic contact layer comprising aluminum or titanium because they (Cu, Ti, Al) are recognized in the art as equivalents.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300 for regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JN
August 1, 2005


TOM THOMAS
SUPERVISORY PATENT EXAMINER